

AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph beginning at col. 5, line 53, with the following:

FIG. 6 is a sectional view showing an example of a conventional sealed actuator; [and]

Please replace the paragraph beginning at col. 5, line 55, with the following:

FIG. 7 is a sectional view showing another example of a conventional sealed actuator [.];
and

Please add the following new paragraph after the paragraph beginning at col. 5, line 55:

FIG. 8 is a side sectional view, similar to Fig. 1, showing a sealed actuator having an encoder instead of a resolver.

Please replace the paragraph beginning at column 14, line 41, with the following:

In general, in a servo motor used for high accuracy positioning, an optical encoder or a magnetic encoder using a magnetic resistance element is used as position detecting means for high accuracy smooth driving. A sealed actuator having an encoder is shown in Fig. 8, which is similar to Fig. 1, but replaces resolver 26 with an encoder similar to that shown in Fig. 7. The optical encoder includes a disc with slits at the rotor side, and a light emitting element and a light receiving element at the stator side. The optical encoder detects the position by detecting the amount of light passing through the optical slits during the rotation of the rotor or the change of interference.

AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

31. (Twice Amended) A sealed actuator comprising:
a motor stator including a stator magnetic pole excited by a rotation-drive coil;
a housing to which said motor stator is attached;
a motor rotor including a rotor magnetic pole disposed opposite to a surface of said stator
magnetic pole through a gap;
an encoder for measuring displacement of said motor rotor; and
a hermetically sealing partition wall made of a nonmagnetic metal material and disposed
at the gap between said stator magnetic pole and said rotor magnetic pole, a space where said
motor rotor is disposed being hermetically isolated from a space where said motor stator is
disposed;
wherein said sealed actuator further comprises reinforcing means for reinforcing at least a
part of said hermetically sealing partition wall, said reinforcing means being made of the same
nonmagnetic metal material as said partition wall, wherein said partition wall is disposed
between said reinforcing means and said motor rotor.

AMENDMENTS TO THE DRAWINGS

New Figure 8 has been added to show an encoder, and is based on Figs. 1 and 7, as originally filed. No new matter has been entered. Also, the specification has been amended to make reference to new Fig. 8.

Attachment: Proposed Drawing Correction Sheet with New Fig. 8

REMARKS

Claims 1-24, 31-33, and 37-39, are all the claims pending in the application. Reconsideration and allowance of all the claims are respectfully requested in view of the following remarks.

Reissue Application

Upon indication of allowable subject matter in this Reissue application, Applicants will surrender the original patent, or make a statement as to loss or inaccessibility of the original patent.

Claim Amendments

Claim 31, last paragraph, has been amended to set forth that the partition wall is disposed between the reinforcing means and the motor rotor. Support for this amendment can be found in Fig. 1, for example, wherein partition wall 33 is shown as being disposed between reinforcing means 40, 41 and the motor rotor 12.

Drawings

The Examiner objected to the drawings under 37 C.F.R. § 1.83(a) as not showing every feature of the invention specified in the claims. Specifically, the Examiner asserted that the optical encoder and the magnetic encoder must be shown or the features canceled from the claims.

New Fig. 8 has been added to show an encoder in general. New Fig. 8 is based on Figs. 1 and 7 as originally filed. No new matter has been entered. Further, the Specification has been amended to make reference to new Fig. 8.

Claim Rejections - 35 U.S.C. § 112

The Examiner rejected claims 31-33 and 37-39 under §112, 1st paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled

in the art to which it pertains to make and/or use the invention. For the following two reasons, Applicants respectfully traverse this rejection.

First, the Examiner has failed to meet his initial burden of establishing a reasonable basis to question the enablement provided for the claimed invention.¹ As stated in *Wright*, the Examiner must provide a reasonable explanation as to why the scope of protection provided by a claim is not adequately enabled by the disclosure. Here, the Examiner merely asserts that there is a lack of enablement, without providing any explanation or reasons for his holding. See the Office Action at page 3, item 7, 1st paragraph.

Second, the specification does, indeed, adequately enable one skilled in the art to which it pertains to make and/or use the invention. The test of enablement is whether one skilled in the art could make or use the claimed invention from the disclosures in the patent coupled with information known in the art without undue experimentation. *United States v. Telectronics, Inc.*, 857 F.2d 778, 8 USPQ2d 1217 (Fed. Cir. 1988); *In re Stephens*, 529 F.2d 1343, 188 USPQ 659 (CCPA 1976). A patent need not teach, and preferably omits, what is well known in the art. *Spectra-Physics, Inc. v. Coherent, Inc.*, 827 F.2d 1524, 3 USPQ2d 1737 (Fed. Cir. 1987).

There are many factors to be considered when determining whether a disclosure satisfies the enablement requirement and whether any necessary experimentation is “undue”. As set forth in MPEP § 2164.01(a), the factors include, but are not limited to:

- (A) The breadth of the claims;
- (B) The nature of the invention;
- (C) The state of the prior art;
- (D) The level of one of ordinary skill;
- (E) The level of predictability in the art;
- (F) The amount of direction provided by the inventor;
- (G) The existence of working examples; and
- (H) The quantity of experimentation needed to make or use the invention.

Here, the Examiner does not appear to consider any of the above factors. Yet it is improper to conclude that a disclosure is not enabling based even on an analysis of only one of

¹ *In re Wright*, 999 F.2d 1557, 1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993).

the above factors while ignoring one or more of the others. The Examiner's analysis must consider all the evidence related to each of these factors, and any conclusion of non-enablement must be based on the evidence as a whole. See MPEP § 2164.01(a). But the Examiner appears to have ignored many of these factors.

Here, many of the factors lead to the conclusion that the specification does, indeed, enable one of ordinary skill in the art to make and/or use the invention as now claimed in claims 31-33 and 37-39.

With respect to consideration (A) and "an encoder for measuring displacement of said motor rotor", claims 31-33 and 37-39 are narrower in scope than original claims 13 and 16 on which they are based. That is, original claims 13 and 16 set forth "displacement measuring means for measuring displacement of said motor rotor". The specification describes at least a resolver rotor and a resolver stator, a magnetic encoder, and an optical encoder, as devices that can measure displacement of the motor rotor. Accordingly, "displacement measuring means" is broader than any one of "an encoder", "an optical encoder", and "a magnetic encoder", as set forth in various ones of claims 31-33 and 37-39. Thus, claims 31-33 and 37-39 are actually narrower in the above-noted regard than are the original claims, which were fully enabled.

With respect to considerations (B-E), the nature of the invention is a mechanical arrangement of parts, wherein the parts are generally well known in the art. That is, as described in the specification, optical and magnetic encoders have been used in sealed actuators. Indeed, the prior art of Figure 7 shows the use of an encoder in a sealed actuator, as does Hofmeister. Accordingly, one of ordinary skill in the art would readily recognize how to make and/or use optical as well as magnetic encoders in a sealed actuator. That is, Applicants do not claim to have invented optical or magnetic encoders, nor to have invented their use in sealed actuators. Instead, it is the total combination of claimed elements that Applicants have invented. Further, because the invention is mechanical in nature, the level of predictability is high. That is, one of ordinary skill in the art would readily be able to predict how the optical and magnetic encoders as set forth in the present invention will behave; they will not behave differently than other optical and magnetic encoders that are already known in the art.

With respect to consideration (F), the inventors do provide direction to the skilled artisan. Specifically, the inventors describe that “[i]n general, in a servo motor used for high accuracy positioning, an optical encoder or a magnetic encoder using a magnetic resistance element is used as position detecting means for high accuracy smooth driving.”² Further, the inventors describe how one would use an encoder in a sealed actuator. The specification states “[t]he optical encoder includes a disc with slits at the rotor side, and a light emitting element and a light receiving element at the stator side.”³ Then, the specification gives the exception to the general case. Specifically, the specification states that use of such optical and magnetic type encoders “is difficult” when the sealed actuator of which they are a part is used in a vacuum environment.⁴ However, the specification describes that use of these encoders is “difficult” not “impossible”. Accordingly, while less desirable for an application involving a vacuum, the specification does not preclude their use in other environments wherein they will provide “high accuracy positioning ... [and] smooth driving”.⁵ Therefore, the specification gives the skilled artisan guidance on how, and in what situations, to use optical and magnetic encoders.

With respect to element (H), little if any experimentation would be necessary to make and use a sealed actuator having therein an optical or magnetic encoder. In fact, as mentioned above, optical and magnetic encoders are already used in sealed actuators. Accordingly, little if any experimentation would be necessary for one of ordinary skill in the art to make and use a sealed actuator, having therein an encoder including either an optical or magnetic type, according to the invention set forth in claims 31-33 and 37-39.

Thus, when considering the evidence as a whole as is necessary for a determination of enablement, one skilled in the art could make or use the claimed invention from the disclosures in the patent coupled with information known in the art without undue experimentation.

² Specification at col. 14, lines 41-44.

³ Specification at col. 14, lines 44-48.

⁴ Specification at col. 14, lines 50-60.

⁵ Specification at col. 14, lines 41-44.

The Examiner rejected claims 31-33 and 37-39 under §112, 1st paragraph, as containing subject matter which was not described in the specification in such a way as to reasonable convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Specifically, the Examiner asserts that the specification does not enable or contain a full, clear, concise, and exact written description of an encoder as a displacement measuring means. Further, the Examiner asserts that the magnetic and optical encoders are not disclosed as part of the invention, and that the specification teaches away from the use of the optical and magnetic encoders. Applicants respectfully traverse this rejection because the Examiner's interpretation of the specification is mistaken.

Although the resolver rotor and the resolver stator are one method of measuring the displacement of the motor rotor, they are not the only way.

The specification describes the variable reluctance resolver as "a displacement detecting means for detecting a relative displacement between the motor stator 11 and the motor rotor 12"; it does not describe the resolver as the only displacement detecting means.⁶ In fact, in the description of the preferred embodiments, the partition wall is described as forming a space in which the rotation-drive coils 14, the motor stator magnetic poles 15, "the coils 27 and the stator 28 of the resolver 26, and the like are accommodated".⁷ That is, the space is for accommodating the resolver or other like displacement measuring devices; the invention is not limited to use of the resolver rotor and stator for measuring displacement of the motor rotor.

The specification describes other methods, for measuring displacement of the motor rotor, that are also suitable. As disclosed in the specification, an optical encoder or a magnetic encoder using a magnetic resistance element can be used as methods of detecting position, which methods achieve highly accurate smooth driving of a servo motor that is used for high accuracy positioning.⁸ Further, although the specification discloses that optical and magnetic encoders are

⁶ Specification at col. 7, lines 1-5.

⁷ Specification at col. 7, lines 38-63. See also, col. 8, lines 13-16.

⁸ Specification at col. 14, lines 41-49.

generally difficult to use in a vacuum environment, the invention is not limited to sealed actuators that are used in vacuum environments. Further, even if in vacuum environments, optical and magnetic encoders can be used depending on the degree of vacuum, required impurity concentration, or the like. As set forth in column 1, lines 4-10, the present invention relates to “sealed actuators, and more particularly to a sealed actuator adapted for use in an ultra-high vacuum environment”. That is, the present invention relates to sealed actuators in general, wherein those actuators can be used in other than vacuum environments. After all, it is only “[a]n object of the invention ... to provide a sealed actuator which does not discharge impure gasses in an ultra-high vacuum environment”.² Moreover, the section entitled “Detailed Description of the Preferred Embodiments” describes “[p]referred embodiments of the invention”; it does not describe the only embodiments of the invention.¹⁰ And those embodiments of the invention are directed to a “sealed actuator 10” in general, not just to a sealed actuator for use in a vacuum environment, which is one example of how the sealed actuator of the present invention can be used.¹¹ That is, specifically, the specification goes on to state that “for example, even if the sealed actuator is used for an ultra-high vacuum apparatus ...”, whereby it implies that the sealed actuator 10 is not necessarily always used in a vacuum apparatus.¹²

Thus, because the sealed actuator of the present invention is not always used in a vacuum apparatus, the use of a resolver is not always necessary; instead, use of an optical encoder, and the use of a magnetic encoder are within the scope of the invention. And the specification conveys with reasonable clarity to those skilled in the art that, as of the filing date, Applicants were in possession of the invention as now claimed, including the use of optical and magnetic encoders, as well as a resolver.

² Specification at col. 4, lines 19-22.

¹⁰ Specification at col. 5, lines 57-65.

¹¹ Specification at col. 5, line 62.

¹² Specification at col. 10, lines 43-46.

Moreover, as further evidence that Applicants were in possession of the invention as now claimed, including the use of optical and magnetic encoders, Applicants' claims 13 and 16 in the '548 patent encompassed these structures. That is, claims 13 and 16 in the '548 patent—which is the subject of this reissue application—set forth a displacement measuring means. As noted above, the displacement measuring means includes at least a resolver, an encoder, an optical encoder, and a magnetic encoder. Therefore, Applicants are now only specifically setting forth various embodiments already included in, and covered by, the displacement measuring means as originally claimed.

Claim Rejections - 35 U.S.C. § 102

The Examiner rejected claims 31, 32, 37, and 38, under §102(b) as being anticipated by Applicants' Admitted Prior Art (hereinafter the APA) or, in the alternative, under §103(a) as being obvious over the APA in view of WO 94/23911 to Hofmeister (hereinafter Hofmeister).

Applicants respectfully traverse this rejection because the APA fails to disclose every element as set forth in Applicants' claims, and because the APA in combination with Hofmeister fails to establish *prima facie* obviousness in that the references fail to teach or suggest every element as set forth in Applicants' claims.

Claim 31 sets forth a sealed actuator comprising a motor stator, a housing, a motor rotor, a hermetically sealing partition wall made of a nonmagnetic metal material and disposed at a gap between the stator and rotor magnetic poles, wherein the actuator further comprises reinforcing means made of the same nonmagnetic metal material as the partition wall. That is, claim 31 sets forth that both the partition wall and the reinforcing means are made of a non-magnetic metal material.

In contrast to that set forth in claim 31, the APA discloses that the partition walls 216a and 236a are made of a non-metal.¹³ And non-metal is not the same as nonmagnetic metal. Further, Hofmeister does not disclose any material in particular from which the housing 16 and

¹³ Specification at col. 3, lines 44-52. See also, Office Action at page 4, item 9, lines 4-5.

partition wall are made. Accordingly, the APA fails to anticipate, or render obvious in view of Hofmeister, Applicants' claim 31. Claim 32 is allowable at least by virtue of its dependency.

Claim 37 sets forth a sealed actuator comprising a motor stator, a housing to which the motor is attached, a motor rotor, and bearings for rotatably supporting a rotation shaft of the motor rotor to the housing, wherein the bearings support the motor rotor at positions on the housing at both sides of a member constituting a sealing partition wall in a longitudinal direction of the motor rotor so that the housing directly receives a load applied to the bearings.

For example, as shown in Fig. 1, vacuum roller bearings 17, 18 are disposed at both sides of a member constituting a sealing partition wall 33 in a longitudinal direction of the motor rotor 12 so that the housing 23, 24 directly receives a load applied to the bearings. That is, the bearings 17, 18 do not act on the partition wall 33. See, for example, col. 12, lines 16-33. Accordingly, the partition wall does not deform upon application of a load to the bearings.

In contrast to that set forth in claim 37, the APA discloses bearings 218 that are mounted, and transmit a force that acts, directly on the partition wall 216a. See Fig. 7. Further, note col. 3, line 59 - col. 4, line 1, wherein for the APA, the specification states that its

bearings [are] disposed in the housings 216 and 236 including the thin partition wall, ...[so that it] has a problem that supporting rigidity of the respective drive shafts to the housings is lowered. ... the force acting on the bearings acts also on the partition wall so that such a possibility can not be neglected that the partition wall is deformed or the partition wall is broken.

Indeed, the upper bearing for each actuator is disposed on the portion of the wall which the Examiner cites as being that "which expands radially outward to the coil end turns when the wall is axially outside the air gap between the rotor and stator."¹⁴ Accordingly, a force acting on the bearings acts also on the partition wall so that such a possibility can not be neglected that the partition wall is deformed or the partition wall is broken.¹⁵

¹⁴ Office Action at page 4, item 9, lines 5-8.

¹⁵ Specification at the sentence bridging columns 3 and 4.

Further, the Examiner cites Hofmeister as teaching optical encoders. But Hofmeister does not teach or suggest bearings for rotatably supporting a rotation shaft of the motor rotor to the housing, wherein the bearings support the motor rotor at positions on the housing at both sides of a member constituting a sealing partition wall in a longitudinal direction of the motor rotor so that the housing directly receives a load applied to the bearings, as set forth in claim 37.

For at least any of the above reasons, the APA does not anticipate, or render obvious with Hofmeister, Applicants' claims 37 and 38.

Claim Rejections - 35 U.S.C. § 103

The Examiner rejected claims 31, 32, 37, and 38, under §103(a) as being unpatentable over the APA and US Patent 2,887,062 to Cametti (hereinafter Cametti) and Hofmeister. Applicants respectfully traverse this rejection because the references fail to establish *prima facie* obviousness in that they fail to teach or suggest all the elements as set forth and arranged in Applicants' claims.

Claim 31 sets forth that the partition wall is disposed between the reinforcing means and the motor rotor. See Fig. 1, for example, showing one exemplary embodiment of the invention wherein the partition wall 33 is disposed between the reinforcing means 40, 41 and the motor rotor 12.

In contrast to that set forth in claim 31, the APA teaches a reinforcing means that is a thicker section of the partition wall 216a, 236a; the partition wall is not disposed between the reinforcing means and the motor rotor.

The Examiner cites Hofmeister as teaching an optical encoder, and cites Cametti as teaching a sealing wall and supports that are made of non-magnetic stainless steel. But neither Hofmeister nor Cametti teaches or suggests a partition wall that is arranged as set forth in Applicants' claim 31.

Therefore, even assuming that one of ordinary skill in the art were motivated to combine the APA with Hofmeister and Cametti as suggested by the Examiner, any such combination would still not teach or suggest a partition wall disposed between a reinforcing means and the motor rotor, as set forth in claim 31.

For at least any of the above reasons, claim 31 is not rendered obvious by the APA, Hofmeister, and Cametti. Likewise, dependent claim 32 is not rendered obvious by these references.

Again, claim 37 sets forth that for each actuator, the bearings support the motor rotor at positions on the housing at both sides of a member constituting the sealing partition wall in a longitudinal direction of the motor rotor so that the housing directly receives a load applied to the bearings.

As noted above, the APA and Hofmeister fail to teach or suggest bearings located at positions on the housing at both sides of a member constituting the sealing partition wall in a longitudinal direction of the motor rotor so that the housing directly receives a load applied to the bearings.

The Examiner cited Cametti as teaching a sealing wall and supports that are made of non-magnetic stainless steel. But Cametti fails to teach or suggest a bearing location as set forth in Applicants' claim 37. Instead, Cametti teaches a rotor 15 having an extension 18 for mounting the rotor, wherein the extension is supported by bearing journal 21, sleeve bearing 23, and bearing housing 31, all of which come between the rotor mounting extension 18 and the thin walled cylinder 12 that seals the stator 4. See Fig. 1A, for example.

Therefore, even assuming that one of ordinary skill in the art were motivated to combine the APA, Hofmeister, and Cametti as suggested by the Examiner, any such combination would still not teach or suggest bearings located at positions on the housing at both sides of a member constituting the sealing partition wall in a longitudinal direction of the motor rotor so that the housing directly receives a load applied to the bearings, as set forth in claim 37.

For at least any of the above reasons, claims 31 and 37 are not rendered obvious by the APA, Hofmeister, and Cametti. Likewise, dependent claims 32 and 38 are not rendered obvious by these references.

The Examiner rejected claims 33 and 39 under §103(a) as being unpatentable over the APA and Cametti and Hofmeister, in further view of FR 2,527,854 to Jacquin (hereinafter Jacquin). Because this rejection is based on the APA, Cametti, and Hofmeister, Applicants arguments as set forth above with respect to claims 31 and 37 are pertinent here and, therefore,

are incorporated by reference. Further, Jacquin does not teach or suggest anything to cure the above-noted deficiencies in the Examiner's attempted combination of the APA, Cametti, and Hofmeister.

Allowable Subject Matter

Applicants thank the Examiner for indicating that claims 1-24 are allowed.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Jeffrey A. Schmidt
Registration No. 41,574

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

23373

PATENT TRADEMARK OFFICE

Date: July 29, 2003